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As this edition of *Montana Schools* goes to press, we are preparing for the special session of the legislature, which has been called for June 16. This will be a critical session for all of government, including local school districts.

Montana is facing a fiscal crisis, notably a lack of revenue to meet our expenses. For instance, while every dollar drop in the price of a barrel of oil may mean a break for consumers at the gas pumps, it also means a loss of \$3 million in revenue for the state. Current estimates of the revenue shortfall for next year range from \$51-\$75 million. In June our legislators will have to find a way to balance our expenses with our income. They have the choice of lowering expenses or raising income through increased taxes of some sort, or a combination of both options.

One of our greatest worries right now is that the legislature might take away the 4 percent increase in the foundation program for the 1986-87 school year, an increase enacted during the 1985 session. I see this as reneging on a promise to education and local property taxpayers, and I am prepared to oppose that raid on local tax dollars with all resources at hand. Preliminary school budgets have been set, levy elections have been run, contracts are finalized, and staffs are set. Any cut in foundation program schedules for next year will either cut services or be passed directly on to local property taxpayers. I fear that, once again, legislators will be tempted to balance the state budget at the expense of education priorities.

We will be working here in Helena to protect Montana's school funding. We have met with the state's educational organizations—School Administrators of Montana, Montana Education Association, Montana Federation of Teachers, Parent-Teacher Association, Montana School Board Association and others—to plan for the upcoming session. It is time to present a united front for the good of education. I urge each of you to pay careful attention to this problem during the next two months and to let your legislator know how you feel.

You also will be hearing more about our proposal to establish a school building and insurance fund using coal tax money. The proposal is a very serious, long-range look at providing for our school infrastructure needs. It will help districts provide adequate classrooms and facilities; it will help the funding picture at the local level; and, most important, it will put Montana coal tax money to use in Montana, serving a need that every community faces periodically. At the end of a 20- to 30-year period, the fund would become a self-sustaining revolving fund without further need to use coal tax dollars.

I wish each of you an enjoyable and relaxing summer!

—Ed Argenbright
State Superintendent
of Public Instruction

A Special Issue

Welcome to the World of Telecommunications

To those of us who were buried in the "technological Middle Ages" of just a few years ago, the term "telecommunication" may conjure an image of satellites and earthlings bleeping back and forth to one another through outer space. After all, we are the oldtimers who remember Sputnik—the satellite that earned our awe even though it looked like a basketball speared with pool cues—and Hal, the rather testy computer that conversed with its operator in *2001: A Space Odyssey*.

After computers, telecommunication appears to be the second wave in the information technology explosion. Though its systems may seem complex, its definition is quite simple: Telecommunication is the ability to communicate over a distance, using electronic means. Satellites, radio waves, optical fibers or other media may be used.

Telecommunication systems commonly used in education fall into three categories: computer communications, or the transmission of data from one computer to another; teleconferencing over telephone lines, offering a medium of communication to a dispersed group of people; and live or pretaped television programs delivered by cable, satellite or other means, often combined with two-way audio communication so that presenters and viewers may speak with one another. It is not uncommon for computer, audio and video systems to be used in combination.

A class accessing a computerized information system for research projects, university faculty using teleconferences to coach classroom teachers in specific skills, or students in a small school on the central Montana prairie watching a satellite-delivered program about a space mission—all are using telecommunications. Like other schools around the country, they are applying this technology to instruction, administration, staff development and other areas.

Advances in telecommunications give educators opportunities to supplement instruction and resolve some of the problems posed by teacher shortages in critical areas, limited curricular resources, increased needs for staff development and limited financial resources. Since such problems can be especially acute in school systems that are small and remote from population centers, rural school administrators are among those who are seeking access to a variety of telecommunications technologies.

For example, telecommunications allow students in 10 rural Montana communities to take a highly technical electronics course by computer communications with a teacher in Helena. A telecourse delivered by satellite, with interactive audio over the telephone and instructional supplements over computers, means that rural students in Oklahoma can meet a foreign language requirement for college entry. Four schools in Illinois "share" a teacher over interactive video/audio telecourses, solving the problem of inadequate enrollment by teaming up electronically.

For all of these schools, communications technology has three distinct advantages: it is interactive, it allows the best available teacher to reach a broad audience, and it extends instruction to people who could not otherwise participate.

Schools will be off course if they treat telecommunications as a problem-free panacea to the woes of tight budgets and limited resources. Many programs are still in the model phase, the technology itself changes rapidly, and what is most appealing may not turn out to be the most practical. High equipment cost and initial investment, the imposition of new teaching and learning styles and local or state policies that don't quite fit a technology that changes daily by leaps and bounds are common problems. All things considered, the best starting point is *awareness*.

In the following pages is a basic, introductory, hopefully enlightening crash course in education and telecommunications. You will learn about various telecommunication systems and how they are used in instruction, administration, information resources, professional development and recreation. An equipment primer will introduce some of the nuts and bolts needed to make new or existing systems telecommunicate. Profiles of a few of many Montana programs will show you how telecommunications are now being used in the classroom, district and community. You'll learn about Office of Public Instruction and national telecommunications services. Also included is comprehensive review of Montana's long and dedicated effort to have its own statewide educational television system.

Schools have been ingesting technology since the beginning of the century—typewriters, language labs, television, teaching machines and audiovisual aids. Educators have managed to hold on to common sense, profit from the wisdom of experience and adhere firmly to a basic assumption about the new education technology: It is best used as a supplement to teacher and text rather than the primary means of delivering instruction. Quite simply, a decision to employ any kind of education technology, including telecommunications, requires a sound comprehension of how a school wants to use technology in its core enterprise, education.

Cover Photo

Ross School's six students pose in front of their schoolhouse, which is 17 miles north of Mosby, on the rolling prairie breaks of the Missouri River. The school is remote, it's small, it's rural. But it's tuned in to the cosmos.

This special issue was uploaded by the following human (vs. artificial) intelligences...

Several OPI staff members turned "techno-twit" and worked hard to bring you this issue. They are:

Cheri Bergeron, Information Resources
Lori Clark, Word Processing
Dan Dolan, Mathematics/Computer Education Specialist
John Heinrich, Information Resources
Ron Lukenbill, NDN/Special Education Staff Development
Ellen Meloy, Public Information
Claudette Morton, English Language Arts Specialist
Margo Rolando, Library Media Specialist

Many thanks to the people in Montana schools who shared information about their programs.

MONTANA SCHOOLS

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WHAT'S THE USE?

School Applications of Telecommunications

It would be a missed opportunity if school programs contributed little more than an appreciation of the dazzle of technology without helping students learn to take it in hand and make it their own.—Alex Molnar, *Educational Leadership*, March 1986.

Technology in education dates back to the first slate and chalk and runs right through the "sunrise semesters" of early educational television. What's "new" about today's technology? More than ever before it gives schools a greater ability to offer sophisticated, *interactive* instruction, using electronic media singly or in concert.

Schools in the state and region are using telecommunications in a variety of areas—instruction, administration, library media, inservice and recreation. Some programs are in the model phase; others are expanding as the technology improves and program sources and offerings grow.

Long Distance Learning

The education reform movement of the past several years has generated policies of instructional improvement and change at a time when resources are fewer. In many states with predominantly rural school systems, the dilemma has forced administrators to be highly creative in seeking solutions to improve instruction and offer vital programs. Although not a solution in itself, educational technology is playing a greater role in these quests.

Since 1980 the Alaska government has operated LearnAlaska, a satellite-based television network and telephone-line audioconference system that links 260 rural sites into instructional programming. The system serves a population of 438,000 spread over 586,412 square miles, delivering instruction primarily through prepared programs.

Oklahoma's public school telecommunications network combines the geographical concept of LearnAlaska with live programming over microwave and cable transmissions. The state's net-

work began with a pilot program to provide otherwise unavailable instruction in German.

Three times a week, nine students in a small high school in Oklahoma's panhandle interacted with their German teacher, an Oklahoma State University professor hundreds of miles away. They communicated through visual (TV) and two-way audio (telephone) media and corresponded by electronic mail to computers, which also were used for language drill and practice, grammar and pronunciation exercises over voice-activated modules. This blend of technologies allowed the students to fulfill a new curricular requirement in foreign language mandated by the Oklahoma legislature as part of an education reform package.

The German program proved so popular, OSU and the state's public schools expanded their cooperative effort and soon reached 50 districts and over 400 students. "Distance learning" now serves districts in Oklahoma, Colorado, New Mexico, Kansas and Texas and includes not only foreign language but physics, calculus and other courses.

As baffling as the initial wave of "ed tech" may have seemed to us just a few years ago, we're learning to distinguish its benefits. Educators no longer ask, "Can it be done?" but, "What is its worth to our students?"

The Utah Department of Education is using distance learning programs to overcome the imbalance of course offerings between urban and rural schools. The state's largest district—serving 3,500 children in an area the size of Connecticut—is offering advanced classes by limited transmission of instructional TV and two-way audio. The state department's Spanish course reaches 23 schools by satellite, teleconference and computers, whose data gathering ability also sends students' test results to the state agency in Salt Lake City, where the teacher is based.

Like their counterparts in other states, Montana schools are beginning to tap the vast potential of distance learning. Systems are as simple as the satellite downlink used at Ross School, 17 miles north of Mosby—one of Montana's remotest. Teacher Robert Anderson and his six students use the downlink for weather studies, current events, public television specials and other programs.

In Missoula the same technology captures programs which teachers adapt for specific curricula. Nancy Bitney, who teaches French and Spanish at Sentinel High School, uses the school's downlink to supplement instructional resources in foreign languages. She and other teachers preview Spanish language programs, news and plays from Montreal or parliamentary sessions from Ottawa—all in French—and adapt them for their students. "We are assembling a library of curricular resources available under licensing or copyright agreements," she said.

At Colstrip High School, the 1986-87 school year will open with a new television studio, the culmination of five years of planning and hard work. According to Megan Fite, library media specialist, "The studio will serve as a closed circuit system for the Colstrip education complex and will be considered for cooperative projects with Colstrip School District and Miles Com-

EDUCATION/INFORMATION TECHNOLOGIES

The more common categories of educational/informational technologies are:

Computer Networks

Computer networks are computers and/or terminals linked so that they can send and receive data. The most frequent method of linking them over distances is through regular telephone lines and a modem. However, the computer signals can be carried by microwave systems, satellites or the dedicated lines of a telephone network.

Technical innovations promise to lower the prices of computer networks over the next few years, making them more practical and available for school use.

Teleconferencing

Teleconferencing is having a two-way or multi-site conference using the telephone (audio) or television (video) or both. Its most common application in education is in instruction, administration and staff development.

Audio teleconferencing is as simple as making a long distance call and hooking up speaker phones to allow more people to hear and participate in the dialogue. A long distance operator can set up an audio tele-

conference, or you can do it yourself by using a teleconferencing bridge. Expenses include telephone charges and purchase of speaker phones or conferencing microphones.

Video teleconferences can be live or pretaped programs transmitted over cable, microwave, satellite or other systems. They are like conventional conferences or workshops, except that participants are at different—and usually quite distant—locations. If the program is live and has an audio link, questions and answers can be exchanged over telephone lines.

Some of the major expenses on the sending end are production facilities and technicians and an uplink. On the receiving end are the expenses of a downlink and telephone charges.

Interactive Instructional Television

Television instruction with two-way audio and visual contact between student and instructor uses some of the same technologies as teleconferencing—cable, microwave or satellite transmission, low-power broadcast or sideband broadcast carried on a regular broadcast signal.

The technology that enables a teacher or

expert at a remote site to deliver instruction live or through videotapes has been around for some time—we used to call it "talking heads TV." However, delivery has become a great deal more sophisticated, and the addition of audio is now common.

Interactive Video

"Microcomputer-video interface"—in computer lingo—combines computers and a video storage unit. When the system is used for instructional purposes, it allows a student at a computer to control a program that in turn controls the storage unit—either a videotape or a videodisc. Thus, student performance controls the instructional sequence.

Videodiscs have tremendous data storage capacities. Their costs are dropping, but not many programs are available due to high development costs.

These technologies may be used by themselves or, in some cases, in combination. In fact, some of the greatest advances in telecommunications today (and to come) are those that blend technologies in an interactive fashion. As the techno-wizards might say, interfacing is where it's at!



Vidiots

munity College and for a service area between Colstrip and Dull Knife Community College in Lame Deer." The studio will have cable and satellite capability, Fite said, and will act as a dubbing center within copyright guidelines for all elementary schools within the school district.

Twenty-eight Montana school districts now have satellite downlinks and use them primarily to supplement instruction and curricula. Other programs around the state are highlighted on pages 8-10.

Electronic Paperwork

Most Montana school districts are in some way using computer technology to enhance administrative efficiency. Record-keeping, finance and accounting, attendance, schedules, grade reports and other basic data are typically managed by computer, although the type, sophistication and volume of a system vary. Once school computers transfer data to a system in a different building or across town, or to Helena, Denver or Tel Aviv, they are telecommunicating.

Great Falls Public Schools is an example of how a large Montana district has linked its schools electronically. Its system networks 16 elementary, two junior high and two high schools through 53 administrative terminals in the district. According to Nick Cetto, data processing supervisor, the system is a result of 10 years hard work. "We have purchased and updated equipment as finances have allowed," he said.

The system is two-way; personnel at the district office may dial for information from a particular school or vice versa. Daily reports are shared through electronic mail. The business of the district and each of its schools—personnel records, payroll, finance, planning, statistical reports, student immunization records, attendance, scheduling, grade reporting, school food inventories, certification, evaluation and seniority records, dropout statistics and more—is managed by the data processing system.

The district also has a computer program that updates community profiles and vital statistics about Great Falls' student population. For example, the program can show how the migration of students from one neighborhood to another or in or out of the city will affect student enrollment at a particular school. Cetto says that the program's "boundary simulations" are made by mapping Great Falls—using the computer's graphics capabilities—with sets of coordinates and extracting the number of students, their transportation needs and other information. The data is indispensable for staff, facility and budget planning.

Because their constituents are spread over a vast geographical area, state departments of education in Alaska and Wyoming (see inset) and other rural Western states find telecommunications essential to a variety of administrative functions. Uses range from automated data collection and bulletin boards to access to agency-run information banks that in turn tap regional and national data banks.

Organizing information or communication networks is basically what the new technology is all about. There is no doubt that as information systems become increasingly sophisticated, school administration will benefit.



Blanche gets bad news in her electronic mail

Information Resources

The term "information search" usually conjures an image of a hard-working graduate student seated between towering stacks in a quiet library at midnight, poring over *Education Index* and gathering citations for a thesis. In fact, not just the academician but everyone uses and needs information. Where it's to be found depends on the type of information sought, when it's needed and in what format.

The graduate student perusing *Education Index* is doing a "hand search," which ultimately would yield citations of relevant journal articles obtainable directly through library or interlibrary loan. He or she also could have gone to an "on-line" source—i.e., a computer terminal linked to a database by way of a modem.

The information now stored in databases and available to general computer users is limitless. Over 1,300 databases containing the equivalent of 50 million books, reports and articles are currently on-line through various networks. New databases are constantly created whenever a university or newspaper computerizes its library and makes it electronically accessible to subscribers.

Databases are accessed through a vendor, which makes available sources such as ERIC and *Education Index*. Common database vendors are Dialog, BRS and SDC. In some cases, the actual article is supplied, or "downloaded" onto a disk or directly to a printer. In other cases, only the citation is given, and the user obtains the actual article in conventional ways.

Schools have several options for on-line database services. They can, as Great Falls Public Schools has done, purchase their own equipment and do their information searches at a district level. They can request a search through their local library or the MINE at the Office of Public Instruction (see page 8). School personnel enrolled at a college or university may use the on-line services of the institution's library, if they are available. In all options, costs will vary.

Consumer-oriented information services, also referred to generally as commercial databases, often have similar databases for subscribers. For example, The Source has a research service, access to U.S. Chamber of Commerce reports on congressional legislation affecting businesses and a variety of other sources. Dow Jones News/Retrieval Service lets you access the latest financial information. Delphi has an on-line, general user encyclopedia (known as the Kussmaul encyclopedia), Dialog Research Library and ITT/Dialcom Information Service. On CompuServe, you can access the New York Times and other databases. These services are available from your own home, if you have a computer, modem and the appropriate subscriptions. (See the *Database Directory* on page 7 for descriptions of these and other databases.)

Library database networks make available the wealth of resources from other libraries. On-line networks such as the Western Library Network (WLN) and cooperatives such as the Montana Federation System, provide these services. Services useful in library management—e.g., catalog cards, bibliographic information—are available along with the resources. Schools may join these library networks.

If you need information, don't be intimidated by the "high tech" of database use. Keep in mind that technology brings together the user and the information in a faster, more thorough and easier fashion.

Inservice/Professional Development

Meetings and workshops for teachers and administrators relating to school improvement, model curricula or other programs are held all over the country. Some require a few hours; others require a few days to a week or more. Nearly all demand travel and time away from the classroom.

Geographical, financial or other constraints often make it difficult to meet the growing needs for professional development. However, the problem is being partially addressed by innovative telecommunications programs. Some use technology that has been around for a while; others are using old and new systems in new ways.

Using telecommunications, educators may "attend" a meeting or inservice workshop without disintegrating a school district's budget. In most cases, all that is needed is a satellite downlink, telephone and program schedule. Program sponsors often will pre-deliver written materials to be used during a session. In other

words, a teleconference has all the ingredients of a conventional conference or workshop, except that participants are not physically present in the same location.

One of the most successful producers of "distance insensitive" training opportunities is the National Diffusion Network, a nationwide system established in 1974 to help schools improve their education programs through the adoption of already developed, rigorously evaluated, exemplary education programs.

In the past few years, NDN has disseminated some of its top programs to schools by satellite. By the end of this school year, 74 NDN programs will have been telecast, bringing eight different training programs to several thousand teachers. Programs have covered adult literacy, technology in the content areas, math, science, reading, writing, classroom management, career education, gifted/talented, special education and other areas. They are delivered by satellite downlink and may include live broadcast, pretaped segments and audio participation by telephone for questions and answers. Some schools tape these programs to show at a time more convenient for interested teachers.

Several Montanans participated on the presenting end of "Conservation for Children," an NDN training session this year. Bob Briggs, science specialist at OPI, Peggy Nelson, Department of Natural Resources, E. Wing Spooner, Montana Power Company, and Gary Swant, Montana Energy Education Council, pretaped information about a cooperative, interdisciplinary energy educa-

Byte-roping
at Wyoming rodeo



WYOMING GOES ELECTRONIC

Educational Information Service Links State and Districts

The Wyoming Department of Education has electronically linked all but one of the state's 49 school districts with WYNET, a telecommunications system that provides regular department mail to local districts and access to state education news and information.

"A commitment from Lynn Simons, State Superintendent of Public Instruction, state department funds to cover initial subscription costs of local districts and assistance from the National School Public Relations Association (NSPRA) were the main ingredients in getting WYNET in operation," said Dennis Kane, the department's communications coordinator.

WYNET operates under the auspices of ED-LINE, NSPRA's nationwide telecommunication system and a subsystem of The Source, in providing an electronic bulletin board of state educational news and information, which is updated on a daily basis by the department's public information office. In addition, the department provides daily to weekly mail to local districts. National education news is accessed through The Source.

WYNET's bulletin board lists 11 items to date: a state education calendar of events; news items from local districts; a directory of state subscribers; press releases distributed by the Wyoming Department of Education to the media; department programs and the people responsible; and instructional software available to districts from the department for review. During the 1986 Wyoming legislative session, WYNET gave daily and weekend updates on education legislation.

"As with any new system, the bugs must be worked out," Kane said. "The department needs to offer districts more inservice on using the system to convince them of the tremendous potential WYNET offers a rural state such as Wyoming."

tion program in Montana. The tape was run during the live NDN training teleconference.

Telecommunications have a vast potential for breaking down barriers of distance, bringing people together for professional enrichment otherwise inaccessible to them.

High-Tech Recreation

It's January in Montana. The snow has piled two feet and, even if there were someplace to go, you wouldn't. What you would really like to do is meet an exciting new person from Lake Tahoe, California, buy a sprout farm, shop for a telescope or play a game of chess with a Chicagoan. Perhaps you wish you could go to a support group for smokers who are trying to quit. "No way can I do this from my living room," you say. Wrong!

With a computer, telephone and modem, the numerous, var-

ious, and ever-growing communication networks are available to you through two different options.

First, you can access a bulletin board or join an on-line information service. There are several thousand bulletin boards in the U.S.—and they are growing so rapidly, even their directories are beginning to look like telephone books. These networks allow you to send and receive messages or access information through data transfer. There are special bulletin boards for medicine, law, education and other interest areas (read about OPI's Bulletin Board on page 8).

Local bulletin boards are available in most major cities and in several Montana communities. They may be accessed by a local telephone call or reached by long distance through networks such as Tymnet or Telenet. (Don't forget, these services aren't free.)

The other option is to subscribe to a user service, which opens

even more avenues for "recreational" telecommunications. Services such as CompuServe, Delphi, American People Link and others require an initial fee, which entitles you to a user ID and password. After that, you are charged at an hourly rate for actual usage time. Some services charge a monthly minimum.

Once you log on, what can you do? You can send and receive mail, shop for ordinary—and exotic—gifts, book a hotel room in Chicago, look over job listings on the West Coast, peruse a list of gourmet restaurants in Seattle, search the user directory for people by geographical area or by interest, play Trivial Pursuit, write continuing novels, check the weather, read the news or look at an encyclopedia entry.

Best of all, you can meet real live people and talk to them on line. After all, telecommunications brings people—not machines—together.

ed/tech

SETTING UP

The Equipment Basics

Not all schools will want to leap into telecommunications as if they were going to show AT&T a thing or two about technology. Like any other investment of funds, time and labor, a telecommunications system requires consumer sense, foresight, good information, planning and hard work.

Below are basic descriptions of some of the equipment involved in telecommunications. It is by no means a complete picture, but will outline a few key areas—perhaps enough to confuse you now, but ideas you will find useful for later reference. *The naming of a specific product or service does not constitute an endorsement by the Office of Public Instruction.*

SATELLITE SYSTEMS

Schools wishing to purchase satellite dishes face the same market as the private consumer. Equipment and prices will vary as the technology changes and grows.

It is important to remember that a satellite dish at a school will mean certain physical requirements for installation at the school facility. Since Montana does not yet have an uplink, a school's dish will be on the receiving end of programs or teleconferences from other sources. Users should be aware of copyright limitations on prepared and live programs before videotaping programs for later use.

COMPUTER COMMUNICATIONS

The Computer

Several combinations of equipment can be used for computer communications. However, at the core of all systems is the microcomputer, hereafter referred to as a "computer" or "micro." In most cases, the features of your computer will determine what type of equipment will be needed to telecom-

municate.

If you have a dusty old machine in the back closet, don't discount the possibility of using it for telecommunications, but also be aware of certain limitations. For example, a terminal that accesses a mainframe can be used, but its recording ability is lacking. A micro can capture on a disk everything coming in from another source so that at a later time you can run a computer program or view, edit or print the data.

Another consideration is how your machine displays data on the monitor. An 80-column display format is common on terminals and most of today's micros. Many older micros have displays of 20, 32, 40 or 64 columns. On these, if the incoming data is 80-column, you won't lose characters in most cases, but the display will be difficult to read. Some manufacturers, such as Apple, offer an 80-column adaptor for their machines. (Before you upgrade your system to 80 columns, check to see if your software will adapt to 80-column format or if you'll need new software.) In other cases, adaptors may not be available, or the machine may be too obsolete to justify the costs.

The literature on computer selection is voluminous, covering well over 500 models of micros on the market, manufactured by 180 different companies. Consumer guidance in the form of books, journals, people with data processing experience, con-

sultants or vendors can help with the selection of computers or the adaptation of existing systems.

The Modem

A special device called a *modem* (from *modulator-demodulator*) is needed to make a computer system a telecommunications system. The modem simply transforms the computer's code into a form that can be transmitted over telephone lines and converts the incoming signals back to a form a computer can understand.

Modems link your system to telephone lines in one of two ways. A direct connect modem plugs into a phone jack like an ordinary telephone. An acoustic coupler taps into phone lines by placing the handset into cups on the modem unit.

To "talk" with other computers or transfer data over the phone lines, your computer must have an internal modem or the ability to accept an external modem. An internal modem is a printed circuit board that fits inside the computer. (Caution: not all computers are designed to accept an internal modem.) Internal modems have the advantage of price. Their serial port (computer-modem connection) is built in, but they don't have some of the extras (e.g., status lights, protective case and, in



Early modem



TECH-TERM GLOSSARY

access—connecting a computer or terminal to another computer or data storage device.

baud—a unit of measurement describing the transmission rate of computer communications. Some people find highly technical differences between baud and bits per second. For practical purposes, the terms are used interchangeably.

bulletin board—a public message system accessed by computer.

database—an electronic collection of information that can be retrieved or stored on a computer (e.g., periodical indexes, en-

cyclopedias, news articles, etc.)

download—to receive data from another computer system. Sending data to another system is *uploading*.

downlink—the receiving end of satellite signals, or a satellite dish. An *uplink* sends the signals to the satellite.

electronic mail—a technique that lets a computer user send a message from his/her computer to another person's computer and vice versa. Sometimes called *E-mail*.

menu—a list of choices within a com-

puter program that allows the computer user to make selections. Most commercial computer networks display a menu of databases within the system.

modem—(from *modulator-demodulator*) a device that allows a computer to send or receive data over the telephone lines.

SYSOP—system operator, so named by the bulletin board subculture.

telecommunication—transmitting information electronically from one source to another.

teleconference—a conference involving several persons using video, telephone or other audio technologies.

uplink—a system that sends signals to a satellite, which will in turn send those signals to a *downlink*, or receiving instrument.

upload—to send a data file or program to another system.

Direct connect modem



Equipment, continued

some cases, speakers). Consequently, they cost less.

A serial port is needed to attach an external modem. Some computers have them; those that don't can be adapted to accept them. An external modem connects to your computer by cable and has several advantages. With the proper cable, you can still use it when you buy a new machine; the modem can be unplugged and used for a different machine in another room or building; and you can hook one external modem to several machines through a switch that allows any one machine to use the modem.

Status lights on the modem tell you if you are connected to the remote computer or if your equipment is sending or receiving. With a speaker, you can actually hear the remote computer answer the phone. These features are helpful if you are having problems with connections.

Modems operate at a certain speed, usually expressed in units called bits per second (bps) or bauds. (Highly technical people find differences between them, but for practical purposes they can be used interchangeably). Modems come in various speeds, from 300 to 56K bps, and are getting faster every day. The most common speeds used today in telecommunication are 300 bps, 1200 bps and 2400 bps. Slower modems may be less expensive, but faster modems use less telephone time.

It is important to note that time spent on line doesn't necessarily translate *directly* into bauds and bits. For example, spending an hour on line at 300 bps doesn't mean that the time would be reduced to 15 minutes at 1200 bps. This is because the majority of on-line time is spent in user decision making rather than actual data transmission. A more reasonable estimate would be that the time would be reduced from 60 to about 45 minutes, depending on the user's experience and task. If you plan to do a great deal of file transfer, such as downloading free micro software, it won't take long to save the difference in cost of a faster modem on telephone charges.

Another consideration is matching the rates of the transmitting and receiving computers. If your modem is 300 bps only and the remote computer is 1200, you're out of luck. Some 1200-bps modems will operate at 300, and some 2400-bps modems will operate at 1200 and 300 bps, so a variable speed modem may be the wisest purchase.

Most modems on today's market are the auto dial, auto answer, direct connect type. They are considered "intelligent" in that they take commands from your computer, such as dialing a number or hanging up. Unlike acoustic couplers, direct connect modems don't pick up room noise, and software can be set up to automatically call a remote computer. However, you should make sure that your software can use the same command set as your modem.

The Software

Using a modem for telecommunications without software, to paraphrase one writer, is like walking on water skis—difficult for some and impossible for the rest of us. Thus, a variety of software is readily available. It is often called a "terminal program" because it tells the microcomputer to think like a terminal that sends and receives data.

When purchasing terminal software, be sure that 1) it is designed for your computer; 2) it will run at the baud rates of your modem; and 3) it uses the same command set as your modem. Unless your telecommunication needs are highly complex, the software should have the basic ability to support your modem's instruction set and save information on disk for later editing and printing. The simplest method for saving information is called "ASCII capture" and is incorporated in nearly all programs. It works well for text, messages and some types of computer programs.

Be aware that some computer programs and data files may require a more sophisticated type of transfer, such as XMODEM, popular because it is public domain (free) software. It can

transfer nearly any type of file and can correct transmission errors. However, among the public domain software with this kind of ability, there is a range of quality. Review all software carefully.

The Telephone System

It is important to consider the telephone system when operating your equipment from within a school. If your system is the type that goes through an operator to get an outside line, a direct connect modem won't work very well. Direct connect modems easily dial numbers but they can't communicate with people. If this is the case, you may need an acoustic coupler or a special outside line for telecommunications.

The Money

Explaining the finances of computers, software programs and modems would take about six more pages—just to give a fair picture. And, by the time you finish reading them, the prices would have changed. Modems can range from \$50 and up (\$200-\$300 average); software ranges from free and up (\$100-\$200 average); and computers range all over the place. If you know the basics of consumer sense and know what you want or how to get good advice, you'll know how to go about pricing a system.

These are some of the more important choices and pitfalls in selecting telecommunications equipment. The only thing that is easy about selecting equipment is this: It's easy to make a mistake. The best advice is to read all that you can stand, make some choices, get an opinion from an experienced person and try some systems.

OPI technical staff are always willing to help. Call John Heinrich for information (444-2471) or dial up the OPI Bulletin Board from your computer (444-3481) and leave a message for John, the SYSOP.

ed/tech

The intelligent application of technology in our public schools and teacher education programs is in the best interest of all segments of society and will require a commitment from the business community, politicians, educators and the larger society.—Drs. Kohl, VonKuster and Mullen, Montana educators, in a 1983 critical issues paper on educational television.

For something that hasn't happened yet, educational television in Montana has had a long and eventful history.

TV For Montana Education, published in 1962, was the work of the Montana Educational Television Committee organized by then State Superintendent of Public Instruction, Harriet Miller. Funded by a Ford Foundation grant, the project included the first local televised instruction as part of a regular school program in Montana. The report also discussed the potential for the effective use of educational television in Montana schools and colleges. However, over 10 years would pass before much else was accomplished.

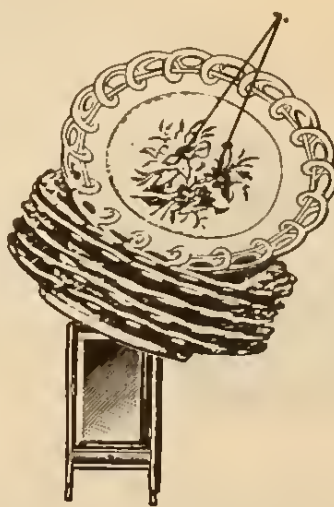
A state broadcasting commission was established in 1974, and the legislature appropriated \$300,000 to be matched by over a half-million federal dollars. The funds were to create a statewide television system that would allow all Montana citizens to receive a combination of Public Broadcasting Service (PBS) programs and locally produced programs. Only a year later, in 1975, the system was lost in a public scandal. The legislature was so strongly against involvement in public or educational television, it prohibited state agencies from even providing technical assistance in this area until 1983.

In the 1985 session, the legislature passed Senate Joint Resolution 32, calling for "an interim study of educational television in Montana" and "requiring a report of the findings of the study to the Fiftieth Legislature." The legislation, proposed by the Office of Public Instruction, passed both houses by wide margins. However, with so many other interim studies proposed, it was not selected for funding.

Although the state became known—and still is—as the only

EDUCATIONAL TV

Still on Montana's Horizon



Early satellite dish

one of the 50 states without an organized delivery system for public and educational television, citizens have acted on their own to get at least some programming. About a quarter of Montana's citizens now have access to educational television through public broadcasting available from Utah, Washington and North Dakota. North Dakota programming excepted, citizens must have cable television or satellite dishes to receive the signals.

The coverage by cable has not meant much for state programming. In 1984 only about 52 hours of Montana programming were broadcast to KUED-TV (Utah public TV) receivers through a special arrangement with Montana State University. About 26 hours were available in 1985. The Spokane, Washington, TV sta-

tion does not have a similar arrangement; thus, there is no measurable amount of Montana programming to western Montana audiences.

A unique Montana educational program was aired earlier this year on both Utah's KUED and Montana's commercial network, MTN. The K. Ross Toole's *Montana* history series was offered for credit through the University of Montana, and over 150 citizens from all over the state were enrolled. Thousands more, including many public school students, viewed the series. The series was produced by MQTV in Missoula through cooperative funding from the Montana Committee of the Humanities, Montana Arts Council, University of Montana, OPI and others.*

Three bright spots on Montana's educational television horizon are local stations at Montana State University and Dull Knife Community College in Lame Deer and a planning grant to Miles Community College in Miles City. The two local stations came on line in the fall of 1984, but the range of each is limited to the immediate areas. MSU has access to an uplink so that it can, for special events, expand its broadcast area to the entire state.

The Miles Community College planning grant proposes to develop an interactive instructional model. A two-way television system would connect several southeastern communities, pro-

*Complete tapes and a study guide of the K. Ross Toole telecourse are available for rental through OPI's Audiovisual Library. Contact your school district's film coordinator for information.

viding classes to public school students and to adults interested in college and continuing education courses. The proposed system is ideal for this sparsely populated area, since it would share resources and provide quality education to this region's citizens.

Both Montana State University and the University of Montana have developed state-of-the-art television production facilities that can produce high quality video. The problem is how to deliver the programs once they have been created. To date, 28 public school sites use a satellite downlink to supplement instructional programs and provide local professional development. However, none of the programs originates in Montana.

Several Montana communities have submitted over 50 different applications for federal grants in the last five years, proposing to explore ways to receive, broadcast and control their own educational (public) television. Eleven have been funded, for a total of \$900,000, and now provide small regions with local TV programming. At present, these projects are exploring the use of technologies which are incompatible with each other. What is needed more than ever is a coordinated effort to provide a Montana signal to the entire state.

Even though the legislature did not fund the interim study on educational television, the Montana Department of Administration has been working under the policy direction of a Telecommu-

nications Policy Advisory Council to improve communication of state government, including higher education, with local government, including public schools. In January the Department submitted a planning grant to the National Telecommunications and Information Administration.

The goal of the grant is to determine the best system, or combination of systems, of television delivery to improve education and professional training in the state. The system would at the same time provide a statewide medium "to better knit us together" as a people.

This proposal is one of the most positive steps in statewide educational television yet. In a letter endorsing the grant, State Superintendent Ed Argenbright wrote:

In a state as large as Montana, a practical [educational television] delivery system would do much to equalize access for schools to special programming and enable them to teach a full curriculum. Such a delivery system would make it possible for the many small rural schools in Montana to offer advanced courses in arts, humanities, science, foreign languages and mathematics taught by expert teachers in their fields.

The history of educational television in Montana—already over a quarter of a century old—is just beginning.

According to the Congressional Office of Technology, by the end of the century, two thirds of the nation's mail—140 billion postings a year—will be handled electronically from one computer to another. If this makes you feel strange, imagine how a Pony Express rider felt when the telegraph was invented.



Downloaded

Database Directory

Anyone with a computer, modem, communications software, a database number and a computer password can "dial for data" from the hundreds of databases accessible to the general user. Databases are the electronic warehouses of information on anything from the price of stock in Mobil, ball game scores and daily horoscopes to bibliographies of journal articles on liver transplants.

Fees for subscriptions to databases can be expected and, of course, the meter ticks for every minute your computer is on line. Minutes spent can cost from a few cents to several dollars. Costs can be immediately reduced (some say by as much as 90 percent) if the user is familiar with the database and its command sequence—that is, logging on, getting into menu items and logging off. One can also save money by accessing databases during nonprime-time or "happy hours," when special rates are offered (usually after business hours).

Below is a list of a few of the databases of special interest to educators. Potential users are urged to seek specific information—especially about current fees—directly from the vendor. The approximate dollar figures we have included were current as of March 1.

Dialog

Major on-line database vendor. Offers over 250 databases covering agriculture, nutrition, business and economics, chemistry, current affairs, biographies, education, energy and environment, foundations and grants, law and government, material sciences, medicine and biosciences, patents and trademarks, science and technology, social sciences, humanities and other subjects. Depending on the database, users may be able to retrieve bibliographies, actual text of articles, numeric data or chemical formulas. Call 800-227-1960.

Knowledge Index

A subsidiary of Dialog. Allows customers to access some of Dialog's most popular databases evenings and weekends. Sign-up: \$35. Connect charges: 40¢/minute. 800-334-2564.

BRS

(Bibliographic Retrieval Service). Comparable to Dialog but with fewer databases. Includes a vocational education database. Differs in price structure and offers a service targeted to the home user (see BRS/After Dark).

BRS/After Dark

Subsidiary of BRS. Allows after business hours use of about 30 BRS databases. Sign-up: \$75, \$12 monthly minimum. Connect charges: \$6-\$12/hour. 800-B33-4707.

Delphi

General information service with E-mail, bulletin boards, news, shopping, etc. Similar to The Source and CompuServe (see below). Sign-up: \$49.95. Hourly rate: (300, 1200, 2400 baud) \$16/hour prime time, \$5/hour nonprime-time. 617-491-3393.

The Source

Major information retrieval service, including E-mail, business news, stock market update, sports, commodity news, educational programs (e.g., ED-LINE—see below), drills, games and more. Subscription: \$49.95, \$10 monthly minimum. On-line charges according to baud rate, prime or nonprime-time. Extra charges for airline guide and financial data. 800-336-3366.

CompuServe

General information service offering catalogue shopping, stock quotes, news, E-mail, on-line CB-type party line and private conversations, an encyclopedia, special interest groups, airline tickets and more. Sign-up (estimate): \$39.95. Hourly rate: \$12.50/hour prime time (1200 baud) or \$6/hour (300 baud). 800-B48-8199.

Dow Jones News/Retrieval Service

Over 25 databases, including stock market quotes, world and national news, financial news, sports, weather, movie reviews, E-mail and an encyclopedia. Price for home user: \$29.95 sign-up, \$12 annual

fee (or \$3 monthly). Connect charges: 90¢/minute prime time, 20¢/minute nonprime-time (300 baud); \$1.98/minute prime time, 44¢/minute nonprime-time (1200 baud). 800-257-5114.

MCI Mail

Sends electronic mail over computer, as paper mail through postal service or as Telex through Western Union or other carriers. Annual fee: \$18. Prices vary according to length of letter and how it's sent. International and next-day service. 800-424-6677.

American People Link

A recreational on-line service offering bulletin boards, special interest groups and CB-type conversations. Sign-up: \$14.95. Hourly rate: \$3.95/hour prime time (300 baud), \$4.95/hour prime time (1200 baud). Special "happy hour" rates. 800-524-0100.

ERIC

(Educational Resources Information Center). Sponsored by U.S. Dept of Education. Consists of 16 subject-specific "clearinghouses," which publish a variety of products. The central facility maintains a database and prepares the abstract journal, *Resources in Education* (RIE), which includes books and materials on microfiche. ERIC's other major component is the *Current Index to Journals in Education* (CJIE), which indexes journals and provides abstracts, but does not provide the journal articles. Comparable to *Education Index*, but with somewhat different journal selection.

ED-LINE

Accessible through The Source (see above). Operated by the National School Public Relations Association (NSPRA), ED-LINE's databases include a newsletter, federal alert, "Ed-Tech" update, legal briefs, community education updates, "RuralLine," national, regional and state networks, an excellence in education section, network directory, education exchange, facts and figures and new research from the National Institute of Education (NIE).

The national database, for example, further provides networks from the American Association of School Administrators, Association for Educational Communications, Council of Chief State School Officers, NIE and others. Access to some of these lines require special subscriptions.

For information, contact NSPRA/ED-LINE, 703-528-6560.

SpecialNet

A major special education database. Includes bulletin board, E-mail, updates on federal legislation, conference listings, special education resources, new products, assistive devices and more. Operated by National Association for State Directors of Special Education. 202-B32-4218.

Agri-Data

National network supporting all areas of agriculture, including classroom instruction. See page B for more information.



Uploaded

PROGRAMS

That Telecommunicate

Plopping students in front of a TV and pointing the satellite dish in the right direction is not an appropriate use of instructional technology. More essential is a teacher's knowledge of how and when to use the medium to stimulate interest and thinking skills.

Computer Communications

Montana Instructional Information for Educators (MINE), is an information service that keeps school staff current on research, education trends, specific teaching strategies and practices and programs that show promise.

Journal articles and materials from the Educational Resources Information Center (ERIC), products developed by regional education laboratories and other resources are available through the MINE. Computerized databanks such as Psychological Abstracts, Dissertation Abstracts, Magazine Index, National Newspaper Index, Exceptional Child Education Resources and others can also be tapped.

When you request information, OPI staff use the appropriate resources to find your answer. A \$35 search fee covers the on-line search, the resultant bibliography and copies of any 10 documents found by the search. You may also be given suggestions on how to get more information—e.g., what programs or consultants to contact, similar programs in your area, etc.

If you wish to know more about the MINE, call Cheri Bergeron at OPI Information Resources (444-2083).

OPI's *Bulletin Board* offers a full range of computer bulletin board services (see inset below). It can be accessed by dialing 444-3841.

Satellite Downlink

The Audiovisual Library at OPI operates *Earth Station OPI*, a satellite downlink in Helena. The dish sits atop the AV Library building.

The system is used to tape programs in classroom instruction, inservice and other educational areas for redistribution to schools, working within copyright laws and licensing agreements. It also is used for teleconferences, allowing participants separated geographically to "attend" important meetings or workshops linked by audio and video connections. When copyright regulations allow it, OPI can tape teleconferences so that schools unable to participate in the original teleconference may use them at a later time.

Earth Station OPI is less than a year old

and has only begun to show its potential service to the education community. For more information, contact Jim Meier at the AV Library (442-3170) or Margy Rolando, OPI's library media specialist (444-2979).

An OPI *internal information system* promises to be an extensive in-house data service that ultimately will assist school districts by keeping OPI personnel thoroughly informed about school accreditation, finance, statistics and other aspects of Montana's education system.

At present, OPI staff can access profiles of each school in Montana—its personnel, address, district number, grade levels, ANB figures, information on funding (foundation program, levies and other sources) and federal programs and allocations. The general summaries give OPI staff insight into the status of public education and help them provide pertinent data to the state legislature.

The system now functions as a computerized school directory. Plans are to expand it to include accreditation and visitation status, program offerings and other areas.

Although not yet a reality, *automated data collection* for state/school administrative reports is being looked at very carefully by OPI staff. Standard school district reports to OPI—for example, the trustee's report and fall personnel roster—are currently gathered on paper forms and mailed in. Such data could be collected electronically. In other words, on a voluntary basis, cooperating school districts (whose data is likely to be on a computer in the first place) would send the information directly to OPI's computer.

OPI already uses this kind of system for the state/federal reporting link and has been since 1977. Montana was one of the first states to submit data on its schools and school districts to the U.S. Department of Education in disk rather than paper form.

The fastest computer in the world prints 45,000 lines per minute. It can print a five-million word, 2,055-page dictionary in 13 minutes. What is it used for? Junk mail.

Welcome to the OPI Bulletin Board

OPI's *Bulletin Board* is a telecommunications network that can be accessed by schools with a computer and a modem. Bulletin Board offers an electronic mail system, computer file transfers and the sharing of public domain software.

School administrators using Bulletin Board can calculate the state foundation program for a particular school year, making it easier to plan budgets and mill levy proposals. During legislative sessions, the latest updates on education bills also can be found on Bulletin Board.

The majority of Bulletin Board users are Montana schools, but messages come from other states as well. However, the record distance for a Bulletin Board user was a person from Prague, Czechoslovakia.

**Access at
444-3481**

Ag Students and Farmers Go High Tech

Montana's vocational agriculture teachers are fast becoming major users of telecommunications, largely through the instructional use of Agri-Data Resources of Milwaukee, Wisconsin, a national telecommunications network that supports all areas of agriculture, including classroom instruction.

At present, 10 Montana high schools subscribe to Agri-Data, using it primarily for instruction and to access a farm marketing database. The instructional database offers over 1,300 lessons ranging from one-day to

two-week units. The teacher's segment of a unit includes lesson plans, exercises, tests and answer keys. The student lessons include text, exercises and projects, as well as tests to evaluate student performance. Ag-ed teachers have made use of Agri-Data's lessons on farm management, cost analysis, cost and cash flow analyses, marketing strategies and teaching students how to use future marketing skills.

Agri-Data can also be used in the classroom for research, as it offers a variety of databases in numerous agricultural topics.

Students working on class projects or teachers researching new units may get printouts with the most up-to-date information.

In Harlowton, vo-ag instructor Gary Olson is using Agri-Data both for his classes and to help support the activities of a local farmers group. Six to 10 Harlowton-area farmers use the school computer to access Agri-Data for marketing information. Several have used the lesson plan on commodity futures and hedging in order to improve their business skills and learn how information technology can benefit their business.

E-mailing chickens to St. Louis



Teaching Students to Use Telecommunications

If you lived in a small, isolated community in northeastern Montana and needed a highly technical vocational course with a specialized instructor, would you give up? Students in schools such as Westby High School don't. They get the instruction they need from a teacher at Helena High School—530 miles away.

Paul Dorrance, an electronics instructor at Helena High, has developed a curriculum that can be delivered by computer communications. Any school with a computer and modem may access it, and 11 schools did so this year. Dorrance's colleague, Lee Holmes, has developed a drafting class that also is well suited to electronic transmission.

The programs are geared towards individual instruction and monitoring of progress. Students initiate their work for the day by instructing the school computer to print out assignments, worksheets, tests and test results. Since the computer takes care of

the paperwork and recordkeeping, the teachers have more time to give personal attention to students, even though they may be hundreds of miles away. Students needing help can enter their questions on the computer, and instructors in the Helena classroom will respond to them. The system also takes or leaves messages through electronic mail and has the further advantage of opening a network among all system users.

The vocational instruction program is designed to extend trade-oriented, specialized coursework to outlying schools. It is geared to schools that, because of their size, have been unable to offer more than an introduction to drafting and electronics.

Computer-managed instruction has known advantages. When it can be telecommunicated, it offers a low-cost method of expanding education options and gives students access to some of the state's best educational resources.



Paul Dorrance of Helena High School helps a student "converse" via computer to electronics students in distant schools.

Glendive Runs TV Station

Dawson County High School in Glendive is wired.

Thirty classrooms have television monitors and receive closed circuit or cable programs. From a television studio in the school, students produce, direct and run the audio and video equipment required to broadcast programs to these classrooms.

Now in its fourth year, the television production class at Dawson, run by instructor Steve Hammer, has taught high school students that there is a great deal more to television than sitting in front of one. They learn the equipment and intricacies of producing, directing and editing and put the knowledge to immediate use. Their programs—including daily morning announcements, sports events, drama activities and interviews—are aired in the school on a routine basis.

In the past, students have produced programs for the local TV station, including a weekly show to enhance school-community public relations. When Senator John Melcher spoke to a social studies class one year, a camera in the classroom broadcast the talk to the rest of the school. Several teachers have pretaped parts of their lectures to show when they are out of the classroom.

The school also has an incoming cable system for educational TV and uses CNN news for history classes and Public Broadcasting Service programs by teacher request.

Students trained in basic television operations at Dawson County High have skills in a medium that is crucial to telecommunications. They could be a vital resource in producing programs for their community and state.



Morning announcements—with students on both sides of the camera—at Dawson County High School in Glendive.

Photo courtesy of Steve Hammer



East Helena students Anna Aggieri and Terry Hadik access the Office of Public Instruction Bulletin Board, learning the ropes of computer communications.

Long Distance Learning

Bill Covey, math and computer teacher at Radley School in East Helena, prepares his young students to use telecommunications by simple hands-on experience. A regular component of Covey's junior high computer classes is using a computer to interact with remote computers, access databases and search them for student research projects.

The unit begins with practice. Two computers are linked together in the classroom so that students can simulate the sending of messages and data from one computer to another. They learn how to dial and access a remote computer and how to upload and download information from one machine to another.

Once the students know how things work, Covey sets up a mailbox on the Office of Public Instruction's Bulletin Board. As a class assignment, students dial the Bulletin Board, look for messages and leave messages for another class. In this way, students from one class exchange electronic mail with students in another class.

Covey then teaches students to access CompuServe, a commercial data network. Students are introduced to the variety of in-

formation available through CompuServe and use its UPI news network, encyclopedia and special databases for research projects. Last year, students wrote reports on agriculture in Montana and, as part of their research, received encyclopedia reports on Montana grasslands over the computer.

Covey's project teaches the basics of computer communications—one example of how Montana teachers are preparing students for the future by using computers as an information gathering and dissemination tool.

All of the words of the Encyclopaedia Britannica can be transmitted from Washington, D.C. to New York in one second by a light-wave optical fiber telecommunications link now in service.

Vo-Tech Shares Services With Community

Great Falls Vo-Tech Center makes its telecommunications system a community affair. The satellite downlink is on the school's premises, but the programs it captures are used for a broad audience—Vo-Tech Center students and instructors, other schools and individuals and groups in the Great Falls area.

"Although we have had the downlink for three years, a marked increase in available programs in business and industry has recently expanded the use of our system," said Duane Roll, the center's media coordinator. Cooperation has been particularly effective with the Great Falls Chamber of Commerce, local business groups, Great Falls Public Schools and the Fire Services Training School, he said.

Through licensing agreements, the center has used programs such as "The Write Course," an adult education course in

writing composition, for students in night classes. It ran a special Texas Instruments symposium on artificial intelligence for its computer instructors and offered other instructors inservice such as "Collaboration in Education and Employment: What It Takes to Make It Work," from the National Center for Vocational Education.

Community programs have included a seminar in small business advertising from Oklahoma State University and several educational programs shown during breakfast or lunch meetings of business people, arranged by the Great Falls Chamber of Commerce.

"We will use our system more and more as these opportunities increase," Roll said. "Every year, more programs are offered, and their delivery becomes more sophisticated. We will take advantage of them for Vo-Tech and the community at large."

Classroom Earth Tunes in Space Missions

Classroom Earth, a nonprofit organization based in Illinois, promotes direct satellite transmission to elementary and secondary schools nationwide. The group is designated by NASA as the official coordinating agency for schools, universities and others wishing to monitor space missions. It was to serve as the official downlink host for the ill-fated Challenger mission, coordinating calls between teachernaut Christa McAuliffe and students across the nation.

Classroom Earth was the offspring of efforts at Hall High School in Spring Valley, Illinois, and a student-built satellite system described in *Electronic Education* as "a portapotty-sort-of-Dutch-windmill-inspired-deathray-type contraption" which students preferred to think of as "northern Illinois' link to the cosmos." The outstanding communications science program at Hall High went from constructing and using equipment to acting as a space mission information center for high school students. Hall's students continue to cooperate in Classroom Earthwatch activities by helping to coordi-

nate others' links to the cosmos, tuning them in to some of the best science programs available, and disseminating curricular information.

Classroom Earth's activities have included a Halley's Comet watch, coverage of Voyager II's encounter with Uranus and other space missions. The group hopes to continue to host science and aerospace programs in the coming school years.

Any school with a reception dish can find Classroom Earth's programming. For schools without satellite dishes, many of the space mission broadcasts are telecast on the cable TV channel NASA-Select or on local Public Broadcasting Service stations. For information about PBS involvement, schools should write Elementary and Secondary Program, PBS, 475 L'Enfant Plaza SW, Washington, DC 20024.

For information about Classroom Earth, write: Sherwood Dees, Classroom Earth, Spring Valley, IL 61362.

WHAT'S AHEAD

High-Tech Learning Will Change the Classroom

When making predictions about the future of educational technology, one is reminded of the auto mechanic who, when asked about "that strange noise in the engine," said, "I have some good news and some bad news."

First the bad news. Inadequate funding for education may continue to be a reality, as dollars are stretched to meet greater demands in traditional and advanced instruction, teacher shortages in critical areas, service to special education and gifted and talented students and other needs. An ever-expanding knowledge base will require educators to keep up and more qualified persons to provide the professional development they need. Montana's size and sparse population will continue to make it difficult and expensive to bring people together for workshops and conferences.

So what's the good news?

The good news is that new and emerging technology, properly implemented by trained educators, may help us address the dilemma of trying to meet greater needs with shrinking dollars. It also might offer educational opportunities not dreamed of today.

This is what a "high-tech classroom" could be like. Specialized classes taught by expert teachers will be delivered by satellite systems with two-way audio and video transmission. Via computer and telephone, students will access databases throughout the world for the latest information from the best sources. Teleconferences will bring people together without losing productive time to travel and distance. Downloading software, including the most advanced graphics, will be implemented by FM subcarrier radio band or simultaneously with video in a

Baud racing



classroom telecast via satellite. Videodisc technology will mean massive data and video storage capabilities.

In the application of advanced technology to staff development, business and industry already are setting an example. Engineers and other professionals at Hewlett-Packard, for example, receive training via video and audio teleconference delivered to the company's 100-unit network. In this way, each staff member is trained by the best teacher.

Communications technology is used to train medical personnel in a variety of areas, including the use of new, highly technical instruments. For instance, a thousand physicians were trained by a surgeon in Indiana, who performed an operation that was telecast by satellite to 26 sites across the country. Two-way audio contact over telephone lines allowed the physicians to consult with the surgeon, who also provided guidance as the "students" then simulated the operation with the new instrument. Using similar communications tools and an experiment appropriate to their science class, high school students could simulate an experiment after a teacher lecture and visually see

the exact results of a variety of options as they perform the experiment.

Instruction and staff development delivered by this kind of communications technology may be on Montana's horizon. The State Department of Administration recently submitted a grant proposal to the National Telecommunications and Information Administration with plans to establish a delivery system in Montana for educational and instructional video (see page 6). Present audio systems are capable of linking all areas of the state; the grant would plan for a satellite uplink so that programs could originate in the state and be broadcast to existing and future downlinks. An interactive teleconference between teachers all over Montana and an expert at one of the University System's units is but one example of how such a system could be used.

The future of educational technology is a vast, rapidly changing frontier. To understand how quickly the technology changes, one only has to remember that many of the computers used by schools today (Apples and C-64s, for example) have a hundred times more power, speed and capability than the mainframes used by large universities only a few years ago.

As baffling as the initial wave of "ed-tech" may have seemed to us just a few years ago, we've come a long way in our ability to distinguish its benefits. The same common sense and careful planning may be applied to future education technology, as educators no longer ask "Can it be done?" but, "What is its worth to our students?"

NEWS BRIEFS

IMPACT PROJECT FUNDED

The Montana Council of Teachers of Mathematics has been awarded a grant of \$400,000 from the National Science Foundation to fund the Integrating Mathematics Programs and Computer Technology (IMPACT) project.

The project is designed to train selected teachers grades 7-12 in integrating the computer into the regular math curriculum, thereby improving the level of instruction and allowing the introduction of new topics and methods. These teachers will then become regional leaders who can offer math inservice to their own or neighboring districts.

The IMPACT project is a cooperative effort of MCTM, the University System and the Office of Public Instruction.

BLACKFEET COLLEGE ACCREDITED

Blackfeet Community College in Browning has received full accreditation status from the Northwest Association of Schools and Colleges. Effective in fall 1985, appropriate credits taken from Blackfeet Community College can be accepted for certificate renewal or reinstatement.

TOP TEACHER FOR 1986-87 SOUGHT

Nominations are now being sought for the Montana Teacher of the Year, the state's outstanding educator for school year 1986-87. Nominees may be dedicated teachers (K-12) in any accredited Montana school.

Any individual or group may nominate a teacher. Selections should be made without regard to age, sex, race, religion, national origin or disability. The chosen teacher will represent Montana in the competition for the National Teacher of the Year.

While teaching excellence—a superior ability to help students learn—should be the primary consideration in making a nomination, participation in professional and community activities

and respect of students, parents and colleagues also are important qualifications.

Nomination guidelines were mailed to schools in April. If you have a potential Teacher of the Year, forward your nomination by September 30 to Teacher of the Year Committee, Office of Public Instruction, State Capitol, Helena, MT 59620.

SPECIAL OLYMPICS THIS MONTH

May 14-17 are the dates of the annual Summer Special Olympics in Helena. The event brings together over 1,500 of the state's developmentally disabled youngsters and adults to participate in a variety of games, sports and other athletic events. The annual games are supported by parents, community groups and citizens.

TEACHER IN SPACE FINALISTS FORM FOUNDATION

The states' 112 finalists for NASA's Teacher in Space project have formed a nonprofit education foundation to encourage and support innovative educational ventures which use the space-age experience to promote classroom learning. Plans for the foundation were made before the Challenger tragedy of January 28.

Among its many activities are plans to publish newsletters and other educational materials, offer professional development grants and encourage college students to pursue careers in teaching.

PROPOSALS SOUGHT FOR DEVELOPMENTALLY DISABLED PROGRAMS

The Montana Developmental Disabilities Planning and Advisory Council (DDPAC) has announced the availability of funds for a statewide project emphasizing recreational and outdoor educational programs and services for persons with developmen-

tal disabilities.

Proposals must be submitted by May 30. For information and proposal packets, contact DDPAC, 25 S. Ewing, Room 506, Helena, MT 59620 (449-8325).

SPECIAL TEST DATE FOR PRECERTIFICATION TEST

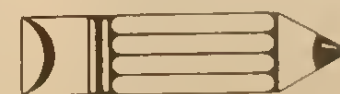
August 9 will be a special test date for the National Teacher Examination Core Battery, usually given several times during the school year. As of July 1, the test is required for initial teacher certification, reinstatement of lapsed certificates and change to certain classes of certification.

Test sites are Eastern Montana College, Billings; MSU, Bozeman; Western Montana College, Dillon; Dawson Community College, Glendive; College of Great Falls; Northern Montana College, Havre; and UM, Missoula. Test site coordinators at each college were listed in the December 1985 issue of *Montana Schools*.

The deadline for registration and fees for the summer test is three weeks before the test date.

ANNUAL CONFERENCE: WOMEN IN EDUCATIONAL LEADERSHIP

The annual Montana Women in Educational Leadership conference—"Leadership, Levity and Personal Power (II)"—will convene June 8-10 at Cross Cut Ranch near Bozeman. The conference is sponsored by the Office of Public Instruction Educational Equity Project. Registration information was distributed to schools in April. Or, call Pat Christie at OPI (444-5664).



RESOURCE NOTES

Resource Notes, by staff specialists at the Office of Public Instruction, give Montana educators a variety of useful information and access to important resources in specific subject areas. If you have any questions about what you read here or simply need assistance, call OPI 444-3095.

LIBRARY MEDIA

Reading Notes, Reading Rainbow

The Five Valleys Reading Council will hold its fall conference in Missoula on September 27. Gregory Denman, teacher, writer and master storyteller from Colorado Springs, and Dr. Twila Liggett, project director of the educational television series, *Reading Rainbow*, will be key speakers.

The 30-minute *Reading Rainbow* segments, hosted by Levar Burton, adapt a children's book, present a related experience, depict the library as a valuable resource and emphasize the development of a positive self-image.

OPI's Audiovisual Library is purchasing several *Reading Rainbow* titles, including *The Day Jimmy's Boa Ate the Wash*, *Digging Up Dinosaurs*, *Gift of the Sacred Dog*, *Arthur's Eyes*, *A Chair for My Mother*, *Tight Times* and *A Gila Monster Meets You at the Airport*. They will soon be available on a rental basis.

Summer Workshops: Library Skills Curriculum

School library media specialists may be interested in a workshop offered by the University of Iowa School of Library and Information Science in Iowa City, June 19-21. The workshop is called, "K-12 Library Media Skills Curriculum: Scope, Sequence, and Correlation with Teachers' Instructional Units."

For information, write Ethel Bloesch, School of Library and Information Science, University of Iowa, 3087 Library, Iowa City, IA 52242.

If you would like to review some books over the summer—and keep them for your library—contact Margy Rolando at OPI.

—Margy Rolando
Library Media Specialist

ARTS EDUCATION

NEA Commissions Artwork

The National Education Association will commission a major work of art to celebrate education and be on permanent display at the NEA building in Washington, D.C. The association is accepting proposals in a nationwide competition to select an NEA member/artist to produce the work.

NEA's ArtSearch project will accept art in any visual medium conceptualized for interior or exterior display. The deadline for proposals is September 1. For application forms, write Howard Belton, Internal Opera-

tions, NEA, 1201 16th St. NW, Washington, DC 20036.

Summer Program in Creative Arts

The Montana School of Creative Arts in Helena offers gifted students grades 7-12 the opportunity for summer study in the visual arts, dance, theatre, music and literary arts. The courses run from June 16-27 and are taught by local professionals and guest artists from other states.

For applications and information, contact the Montana School of Creative Arts, PO Box 606, Helena, MT 59624 as soon as possible.

—Janet Atwal
Arts Education Specialist

SCIENCE

The Right-To-Know and School Lab Safety

In 1985 the Montana legislature passed the Employee and Community Hazardous Chemical Information Act, also known as the "right-to-know law." It is intended to enhance worker and community safety by requiring employers to provide information on the potential hazards and safe handling of chemicals in the workplace, including schools. The law is effective on May 25, 1986. A transition period will allow employers to achieve compliance without undue burden.

School science laboratories will be subject to parts of the law but exempt from others. Schools will be required to meet these standards:

1. Make available all Material Safety Data Sheets (MSDs) received from chemical suppliers.
2. Retain labels on chemical containers. (The law does not specifically state what to do about chemicals transferred to other containers, a common practice in school labs.)
3. Provide annual teacher education and training. Specifically, a school must include instruction in interpreting labels and MSDs and the relationship between these two methods of communicating about hazards; the location and acute and chronic effects of hazardous chemicals used in the laboratory; and safe handling, protective equipment, first aid treatment and clean-up and disposal procedures for hazardous chemicals. The school shall also keep a record of the dates of teacher training sessions and names of teachers attending.

Schools will be exempt from: 1) obtaining MSDs for all hazardous chemicals in the lab; 2) compiling a workplace chemical list; and 3) recording information with the county clerk.

The law applies only to chemicals listed on the American Conference of Governmental and Industrial Hygienists (ACGIH) Threshold Limit Values for Toxic Substances List and the OSHA Subpart Z list. Most school science labs use several to many of the chemicals listed.

The law is to be administered and enforced by county governments. The State Department of Health and Environmental Sciences (DHES) may provide education and

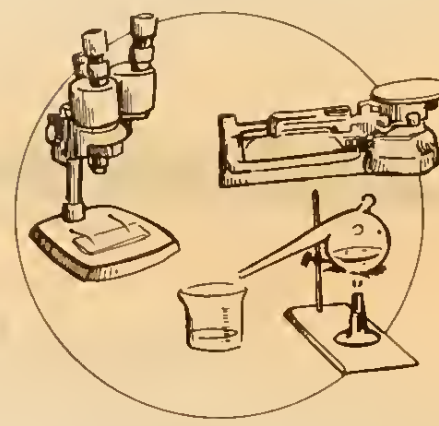
training programs, develop and distribute informational leaflets or contract with university, public or private organizations to develop informational programs.

For information about the law and a free brochure describing its effects on schools, contact your county clerk and recorder, county health department or DHES, Environmental Science Division, Helena, MT 59620.

Safety Workshops

Through a grant to MSU's Science/Math Resource Center (S/MRC), the Office of Public Instruction is offering regional science safety workshops this school year. The project involves the cooperation of university, public and private school educators and concerned public officials working to increase safety awareness and improve safety practices in school labs. The workshop meets a school's need for chemical safety training under the "right-to-know-law" (see above). For information, contact Russ Hartford or Gary Freebury, Flathead High School, Kalispell, MT 59901 (755-7130). Information can also be obtained from S/MRC or OPI.

—Bob Briggs
Science Education Specialist



GIFTED & TALENTED

Summer Institutes

Summer offers a variety of enrichment opportunities for Montana's gifted and talented students.

Summer programs are at the University of Montana, including one-week Summer to Explore Professions (STEP) sessions, June 23-August 15, and Computer Camp, June 23-July 3 (grades 7-12); MSU, July 28-August 1 (Peaks, Potential and Special People, grades 5-9) and June 24-July 18 (Writing With Children, K-6, open to teachers and children); MALT Language Camp south of Absarokee, mid-August (grades 9-12); Red Lodge Music Camp, June 7-15; Carroll College, Helena, July 6-12 (grades 5-8) and July 13-19 (grades 9-12); Eastern Montana College's College for Kids, July 14-18 (grades 4-6); Discovery Institute, July 7-11 (grades 7-9) and Suzuki Institute, June 16-21 (grades 3 and up); and Rocky Mountain College's Computers and High Technology Summer Camp, June 15-20 and 23-26 (grades 7-10).

Teachers may be interested in the Talents Unlimited (June 23-25) and Integrated Learner (July 14-15) seminars at Dawson Community College; Selected Topics in Gifted Education, July 10-12 and 17-19,

Northern Montana College; Gifted and Talented Institute (June 9-13), Issues in Gifted Education (June 17-26), Creative Problem Solving (June 30-July 10), Learning Styles (July 17-31) and Teaching Effective Thinking (July 21-31) at Eastern Montana College; and Of Play and Prodigies: Working With the Academically Able Student (July 18-August 14) at MSU.

—Nancy Lukenbill
Gifted and Talented Education

PUPIL TRANSPORTATION

1986 MAPT Conference

Don't forget to make plans to attend the Montana Association for Pupil Transportation conference at the Great Falls Sheraton, June 26-27. MAPT will again sponsor a first aid course on June 25, before the conference starts. The steering committee plans interesting workshops based on the conference theme, "No Safer Way to Travel." Our featured guest speaker will be Carlisle Beasley, Pupil Transportation Director for Metropolitan Public Schools in Nashville, Tennessee.

25-Year Award

If you know a school bus driver who has 25 or more years of safe driving experience, please let us know. We would like to present these people with an award, but we won't know who or where they are without your help. Remember, he/she must have 25 or more years of school bus driving. Please notify Russ Malone, MAPT Awards Chairman, PO Box 421, Scobey, MT 59263.

Advanced Driver Education Workshops

The annual OPI-sponsored Advanced Driver Education Workshops will run in Lewistown from June 9 through October 3 (54 one-day workshops; none in August). Please refer to our recent mailing for sign-up information. If you have questions or need more information, call Terry F. Brown at OPI (444-4396).

—Terry F. Brown
Pupil Transportation Specialist

TRAFFIC EDUCATION

ADTSEA Membership

If you've always wanted to be a member of the American Driver and Traffic Safety Education Association but felt you couldn't afford it, now is your chance to join for only \$15 if you have never been a member. Just send your check to ADTSEA, 123 N. Pitt Street, Alexandria, VA 22314.

Safe Driving Practices

The arrival of spring increases motor vehicle travel and results in a seasonal rise in traffic fatalities. Emphasize the following with your students for excellent reinforcement:

RESOURCE NOTES

Safety Belts—Wear your safety belts at all times. Lap and shoulder belts are 40 to 50 percent effective in reducing fatalities.

Alcohol—Don't drive if you have been drinking. Alcohol slows reaction time and is a factor in half of the nation's traffic fatalities.

Car Care—Inspect wiper blades and light lenses, replacing worn or broken parts. Check fluid levels. Replace worn or deteriorated hoses and belts.

Tires—Keep tires properly inflated and rotate them periodically. Check front-end alignment. Replace worn tires.

Brakes—Be alert to changing or unusual performance.

Parking—Don't leave your vehicle running and unattended. Automatic transmissions can slip into reverse gear. Put the gear lever securely in Park, turn off the engine, apply emergency brake.

Work Zones Dangerous for Crews and Motorists

"For your sake and theirs, please slow down in highway work zones." That's the message highway workers are trying to get to motorists this spring as Montana moves into its highway improvement season. More work than ever—resurfacing pavements, replacing bridge decks and pavement joints, laying down new shoulders and making other improvements—is taking place. Remind students of these hazards and dangers.

DOT Releases Study on Driver Education

High school students who received special driver education courses emphasizing safety were involved in fewer crashes and had fewer violations during the first six months after they received their licenses, according to a study prepared for the Department of Transportation.

Have a good summer!

—Curt Habn
Traffic Education Specialist

FOOD SERVICE

Summer Food Service Program

The Office of Public Instruction is seeking qualified sponsors for the Summer Food Service Program. Sponsors receive federal funds for meals served to children in needy areas during extended school vacations (summer or any school vacation of at least three weeks). Public or nonprofit private schools, residential summer camps and units of local, municipal or county government are eligible if certain criteria are met.

Sponsors must be able to: provide a continuing year-round service to the community; prepare meals or obtain vended meals to serve children on a regular schedule; operate their program in areas where at least half of the children would qualify for free or reduced price meals under National School Lunch or Breakfast guidelines; accept financial and administrative responsibility for all sites where meals are served; and demonstrate their ability to operate the program

and have enough personnel to supervise, operate and monitor each site.

For more about being a sponsor, write Division of School Food Services, Office of Public Instruction, State Capitol, Helena, MT 59620.

Training Conferences

OPI's Division of School Food Services, in cooperation with the Montana School Food Service Association, is again conducting two school food service training conferences this summer. The first is August 5-7 at Big Sky High School, Missoula. The second is August 12-14 at Billings West High School. The preregistration fee is \$20 for MSFSA members, \$25 for nonmembers, with fees due by July 15. After this date and at the door, registration is \$27.50 for everyone. A registration information packet has been sent to all food service managers.

Co-op Purchase Orders Due

Superintendents, managers/cooks or clerks are encouraged to prepare their cooperative food purchase orders before school lets out for the summer. Purchase orders are due at OPI by June 27. The bid will be let September 4, with delivery by October 24.

—Brisbin Skiles, Director
Division of School Food Services

NUTRITION EDUCATION

Free Resources from Dairy Council

Each teacher in a school can receive free nutrition education resources from the National Dairy Council. Use the order form and catalog mailed to your superintendent to select the resources. The deadline for this offer is the end of this school year. If the order form has been lost, contact Ann Ferguson, Nutrition Education Specialist, Office of Public Instruction, State Capitol, Helena, MT 59620 (444-4414).

—Ann Ferguson
Nutrition Education Specialist

MATH/COMPUTER ED

Copies of Needs Assessment Available

The statewide needs assessment survey, completed last fall as part of an application for funds from the federal math/science/foreign language legislation, is now available to schools.

A summary report in the following categories may be obtained from OPI: elementary principals, secondary principals, elementary teachers, secondary math teachers, secondary science teachers, secondary computer science teachers and secondary foreign language teachers.

Contact Dan Dolan (444-4439) or Bob Briggs (444-4436) in the Division of Basic Skills.

Needs Assessment Results

In spring 1985, Montana schools made a comprehensive assessment of their needs in mathematics, science, computer education and foreign language. The assessment was one requirement for funding under federal math/science/foreign language legislation, PL 98-377. In fall 1985, summaries of the assessment were sent to all schools.

In mathematics, elementary teachers identified the needs with the highest priority as: 1) teaching problem solving strategies and higher order thinking skills in mathematics; 2) an activity approach to mathematics instruction; 3) increased use of the calculator; and 4) teaching estimation skills.

At the secondary level, needs with the highest priority were: 1) use of the computer and calculator in mathematics teaching; 2) the most current trends in the mathematics curriculum; 3) teaching problem solving and higher order skills; and 4) the use of an activity approach to mathematics teaching.

In the coming school year, districts will seek ways to officially expend math/science legislation funds for staff development in mathematics. They also will seek means to meet the new three-day requirement for staff development mandated by the Board of Public Education. Mathematics programs are now under way to help districts meet these needs.

Forty-six elementary teachers will attend summer leadership training at the University of Montana and Montana State University as part of the Excellence for Montana Mathematics Education (EMME) project for teachers K-8. The program is designed to present new methodology in elementary level mathematics, increase teacher background in mathematics, develop an activity methodology for teaching and use problem solving as the focus for mathematics instruction. These teachers will then be available during the school year to present local and/or regional mathematics inservice workshops for other teachers.

Curriculum Conference

On October 15, a special meeting will be held at Montana State University. The Mathematics Curriculum Development Conference will feature Jane Gawronski, mathematics curriculum coordinator in Walnut, California, and a designer of that state's mathematics curriculum framework. Her three sessions are: The Mathematics Curriculum: A Need for Change; Critical Issues in the Mathematics Curriculum; and The Process of Curriculum Development: How to Make It Happen.

Districts will be invited to send two to four representatives to this conference. Methods for developing district mathematics curricula K-12, sample curricula from other districts and states and comparisons of local curricula to other district and state curricula will be a part of the day-long conference.

The conference will be funded through math/science legislation monies; districts are encouraged to use some of the local money to send teachers to the conference.

The conference precedes the Montana Council of Teachers of Mathematics state convention, October 16-17. Eleven sec-

tionals will be directly related to some of the critical issues discussed on October 15. These three days are an outstanding staff development opportunity for Montana's mathematics teachers.

Calculators and the Classroom

Recent surveys of Montana schools show that 100 percent of the state's junior and senior high schools have one or more computers available for student use. Twenty-nine percent of the teachers in the math needs assessment survey reported that they regularly use a computer in the mathematics classroom.

In other words, schools are spending thousands of dollars on computers to make students "computer literate" and feel that it is important to have this expensive machinery available for student use. Yet these same schools find it hard to justify the cost of five-dollar hand calculators to make students "calculator literate" and to integrate the tool into math teaching.

The National Council of Teachers of Mathematics (NCTM) and its Montana affiliate (MCTM) have published position papers on the effective classroom use of the calculator. One of NCTM's Agenda for Action recommendations states that "mathematics programs must take full advantage of the power of calculators and computers at all grade levels." It further recommends that "all students...have access to calculators and increasingly to computers throughout their school program, that schools should provide calculators for use in the elementary and secondary classrooms and that calculators should be available for the appropriate use in all mathematics classrooms, and instructional objectives should include the ability to determine sensible and appropriate uses."

Calculators must be used imaginatively to explore, discover and develop math concepts, not merely for recreation, computational checking or for drill and practice. Teachers must be able to find ways to ensure that math instruction makes proper use of the hand calculator, not only in teaching of content, but for problem solving and investigation of patterns.

Before we continue a head-long plunge into technological literacy and spend many more dollars on computers, it may be time to stop and take a good look at a smaller investment in class sets of hand calculators. They might go a long way in improving the level of our math instruction and technological literacy.

—Dan Dolan
Math/Computer Ed Specialist



OPI SPECIALISTS MAY BE
REACHED AT
444-3095

UNCLASSIFIEDS

Unclassifieds is a bulletin board of resources, events and announcements of interest to educators. The naming of a service or product does not mean a recommendation or endorsement by the Office of Public Instruction.

CONFERENCES/WORKSHOPS

TAFT SEMINARS IN GOVERNMENT

The Taft Institute for Two-Party Government is sponsoring its annual Seminars for Teachers, an opportunity for elementary and secondary teachers and administrators to upgrade and refresh their teaching of the U.S. Constitution, two-party political system and local, state and national government. Graduate credit is available.

Seminar leaders are practicing politicians—elected officials, party leaders and political experts. The emphasis is on making politics and government come alive in the classroom and helping teachers learn new ways to teach students the meaning of self-government and citizen responsibilities.

Montana teachers are eligible for Taft seminars in the following states: *Idaho*, July 14-August 1, Boise State University (Dr. Willard Overgaard, Dept. of Political Science, Boise State University, Boise, ID 83725); *Utah*, June 16-27, University of Utah (Dr. J.D. Williams, Hinckley Institute of Politics, University of Utah, Salt Lake City, UT 84112); and *Washington*, July 6-18, Western Washington University (Dr. Donald Alper, Political Science Dept., Western Washington University, Bellingham, WA 98225).

Contact the local director listed above for applications.

ADMINISTRATORS WORKSHOP

The Office of Public Instruction will present a summer workshop to inform and update school administrators in topics and issues that affect their schools. The workshop will be held June 23-25 at MSU in Bozeman in conjunction with the School Administrators of Montana conference.

School administrators will receive details in a May announcement. If you would like more information in the meantime, contact Ray Shackelford, Assistant Superintendent for Administrative Services, OPI, State Capitol, Helena, MT 59620 (444-3169).

GENDER EXPECTATIONS PROJECT TRAINS TEACHERS

Gender Expectations and Student Achievement (GESA), a facilitator training workshop, will be conducted for 60 elementary teachers, administrators and Office of Public Instruction staff May 1-3 in Whitefish. The workshop culminates a six-month OPI project to train teachers to conduct inservice in their districts.

The objective of the GESA project is to increase individual student achievement by reducing disparate treatment of students in the educational areas of curriculum, environment and teacher-student interactions,

including instructional contact, grouping and organization, classroom control, self-esteem and evaluation.

Observable results in the classrooms of teachers who practice GESA methods are increased student attentiveness, participation, effort, self-esteem and interest. Teacher selectivity for instruction is appreciably reduced, and classroom atmosphere and student attitude improve with a corresponding decline in reproof requirements.

GESA facilitator workshop instructors are Dolores Grayson, Project Director, Los Angeles County Office of Education, and Patricia Christie, Educational Equity Specialist, OPI.

NATIVE AMERICAN LANGUAGE INSTITUTE

Educators, language specialists, folklorists, historians and writers will gather in Oklahoma City May 28-30 for the International Native American Language Institute (NALI). This year's theme is "Pre-eminence of Native Language Pluralism: Transition for Survival, Support and Self-Preservation."

Conferees will focus on native language concerns, idea exchanges and direction for continued research and development in Native American language issues. College credit is available.

Contact Shirley Brown, Achakama Multicultural Indian Education, Box 963, Chocataw, OK 73020 (405-390-3004).

INSERVICE ON YOUTH SUICIDE PREVENTION

By arrangement with schools, Bob Deaton and Dan Morgan of the University of Montana will present PIR-day training for teachers on youth suicide prevention. The inservice sessions, as well as meetings with student and/or parent groups, are available in half-day or two-day formats. Fees are negotiable, based on what a district usually pays for outside instructors.

For more information, contact Bob Deaton, Dept. of Social Work, University of Montana, Missoula, MT 59812 (243-5543).



SUMMER STUDY

AEROSPACE WORKSHOPS

The Montana Aeronautics Division is offering scholarships and funding valued at \$100 per participant for teachers interested in attending one of six Aerospace Workshops. Workshops are planned at the University of Montana (Missoula), Montana State University (Bozeman), Eastern Montana College (Billings), Carroll College (Helena), Northern Montana College (Havre), and Dawson Community College (Glendive).

Credit is available.

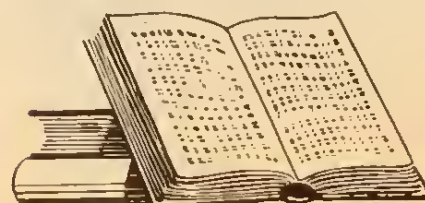
Contact the Montana Aeronautics Division, PO Box 5178, Helena, MT 59604 (444-2506).

EQUITY COURSE

MSU's College of Education is offering a one-credit summer seminar to acquaint school personnel with laws and regulations governing equal education opportunity and freedom from gender-role stereotyping.

Topics include Title IX, the State Board of Public Education's equity standard for school accreditation, Ridgeway Settlement Agreement grievance procedures and other issues. The goal is to help educators integrate this knowledge into everyday practice.

The Sex Equity Seminar will be given from June 24 through July 18 on Monday and Wednesday afternoons. Contact John Clarkson, Sex Equity Coordinator, Women's Resource Center, Montana State University, Bozeman, MT 59717 (994-3836).



TEACHERS SOUGHT FOR LAW EDUCATION STUDY

The fourth annual Montana Law-Related Education Program, sponsored by the Office of Public Instruction, State Bar of Montana and Montana Supreme Court, will be held July 14-18 in Helena.

The innovative five-day course gives teachers practical methods for teaching law to elementary and high school students. It has proved to be valuable to teachers in political science, social studies, English, business, government and other curricular areas.

Guest instructors are members of the Montana Supreme Court, Doug Chase, Missoula Chief of Police, Hal Stearns, teacher at Missoula's Sentinel High School and Montana Teacher of the Year 1986, and other judicial and law enforcement personnel.

Tuition and materials are free, and two inservice credits are available. The class is limited to 40 participants, who will be selected on a first come, first served basis. For information, contact Legal Services, Office of Public Instruction, State Capitol, Helena, MT 59260 (444-4402).

YELLOWSTONE IS THE CLASSROOM

Make a national park your classroom this summer by treating yourself to the unique courses offered by the Yellowstone Institute. The courses range from two to eight days and are headquartered in Lamar Valley, in the heart of Yellowstone National Park.

Topics include geology, Yellowstone artists, Native Americans, natural history, wilderness horsepacking, canoeing, outdoor photography, bears, bison and stargazing, to name a few. About a third of the courses

may be taken for credit. Some courses are designed for families or children.

The summer classes are one of the most enriching educational opportunities around. Contact the Yellowstone Institute, PO Box 117, Yellowstone National Park, WY 82190 for a catalog and information.

SUMMER SEMINARS IN HUMANITIES

The Montana Committee for the Humanities is sponsoring summer seminars for selected teachers who wish to make an in-depth study of several humanities topics. Participants in the four-week seminars will receive graduate credit.

Two seminars at the University of Montana begin on June 23: "Concepts of Heroic Virtue in the *Iliad*, *Aeneid* and *Bhagavad-gita*" and "Terrorism Past and Present." A seminar entitled "The Upper Missouri River: Corridor and Icon" will be held in Havre and includes a one-week float on the Missouri River.

Up to 15 participants will be chosen for each seminar. In addition to a \$200 stipend, travel and expense money is available to teachers who must relocate for the seminar.

Contact the Montana Committee for the Humanities, PO Box 8036, Missoula, MT 59807 (243-6022).



PUBLICATIONS

SCHOOL LAW BOOKS UPDATED

The 1985 edition of *School Laws of Montana* is available for \$8 per copy from the Office of Public Instruction, State Capitol, Helena, MT 59620, Attn. Tom Simmons.

STUDY IDENTIFIES ATTRIBUTES OF SUCCESSFUL SCHOOLS

America's most successful schools have positive, motivated teachers who are committed to their profession and believe they will be successful with students, and administrators who take their leadership roles seriously.

These are just a few of the key ingredients of successful schools, according to *Profiling Excellence in America's Schools*, published by the American Association of School Administrators (AASA). The study highlights schools from the 154 secondary schools identified in 1983 as the "best in America" by the U.S. Department of Education. The study also suggests ways that schools can improve learning.

The study is available for \$16.95, plus \$3 for postage and handling, from AASA Publications, 1801 N. Moore St., Arlington, VA 22209-9988.

HEALTH

HEALTHY MOTHERS MEAN HEALTHY BABIES

Did you know that only 14 countries worldwide have lower infant mortality rates than the U.S.? Half of the pregnant women in Montana in 1983 did not receive optimal prenatal medical care? Nearly six percent of all babies born in Montana in the past 10 years were either premature or of low birth weight?

These and other statistics show that a great deal needs to be done to improve pregnancy health and outcome. The Montana Coalition of Healthy Mothers, Healthy Babies is busy on a number of fronts.

This coalition of citizens, health and medical professionals, educators and public policymakers sponsors a variety of activities to reduce the risk of maternal, perinatal and infant mortality and disease through public and professional education. Focus is also on preconception counseling, nutrition and other health topics for young women ages 15-24. The coalition's toll free Pregnancy Risk hot line will be operative in mid-May. Callers can obtain information on the effects of drugs, tobacco and household chemicals on pregnancy outcomes.

For more information, write Healthy Mothers, Healthy Babies, PO Box 876, Helena, MT 59624 (444-4740).

SCHOLARSHIPS

VOICE OF DEMOCRACY

The Voice of Democracy Scholarship Program, sponsored each year by the Veterans of Foreign Wars and its Ladies Auxiliary, an-



Statue of Liberty Honor Roll

Add these schools to the list of schools whose students have worked hard to raise funds for the renovation of the Statue of Liberty and Ellis Island National Monument:

Trout Creek Elementary
Highland School, Billings

nounced its theme for the 1986-87 school year: "The Challenge of American Citizenship." Schools are encouraged to begin their programs early. Contact your local VFW branch for information.

The state winner for 1985-86 was Corbit Harrington, a senior from Ekalaka. Participation in last year's program was up 50 percent. The VFW and Ladies Auxiliary thank all educators whose efforts made the program successful.

FULBRIGHT TEACHERS SOUGHT

The 1987-88 Fulbright Teachers Exchange Program, sponsored by the U.S. Information Agency, is seeking applications from elementary and secondary teachers and college faculty. The program involves a one-on-one exchange with educators from Canada, Britain, France, Germany, Belgium/Luxembourg, Denmark, Norway, Switzerland, Colombia and Argentina. The number of positions and eligibility requirements vary by country.

The program also offers opportunities for teachers to participate in three- to eight-week seminars in Italy and the Netherlands in the summer of 1987.

Applications will be available this summer. Write: Fulbright Teacher Exchange Program, E/ASX, U.S. Information Agency, 301 4th St. NW, Washington, DC 20547.

RESOURCES

"FIRST LADIES" VIDEO JOINS AV LIBRARY COLLECTION

A videotape of *First Ladies of Montana*, a TV special with Norma Ashby, has been acquired by the Office of Public Instruction's Audiovisual Library and is now available to schools on a rental basis.

The program includes interviews with Jean Schwinden, Carol Judge, Evelyn Anderson, Betty Babcock and Maxine Nutter Larson, wives of Montana governors present and past. The program aired in February on the MTN network.

If you are interested in using the program in your classes, contact your school district film coordinator.

POSTER DEPICTS AMERICAN HERITAGE

A colorful poster depicting three black American heroes is available to commemorate "The Spirit of America," a fund raising campaign sponsored by the Pad-dington Corporation. Proceeds from the poster will be donated to the United Negro College Fund.

Pictured on the poster are Sojourner Truth, a freed slave who became one of the most admired abolitionists in the mid-19th century; Jim Beckwourth, scout in the Old West; and Matthew Henson, an explorer who accompanied Admiral Peary to the North Pole. The poster can be a resource for activities during Black History Month (every February) or for other studies.

Posters may be obtained from J&B Poster



Series, c/o B&S Fulfillment, 179 Saw Mill River Road, Yonkers, NY 10701. Enclose a check or money order donation to: The United Negro College Fund.

MADD GUIDE FOR PARENTS

Parents Care Guide, a booklet offering parents strategies and suggestions for working with youth alcohol/drug abuse problems, is available from Montanans Against Drunk Drivers (MADD) in early May. The

booklets will be distributed to parents by elementary and secondary public schools. For additional booklets, contact MADD, 1008 13th Ave. S., Great Falls, MT 59405 or your local library.

ATTITUDES BOOKMARK FROM EASTER SEALS

The National Easter Seal Society has issued a new version of its bookmark for students, "When You Meet a Classmate Who Has a Disability." The bookmark, one of the organization's most popular public awareness resources, gives children tips for understanding, assisting and enjoying the friendship of those with disabling conditions of various kinds. It is suitable for readers in grade 3 and up.

Single bookmarks are free with a stamped, self-addressed envelope (business size). Quantity rates are \$9 per 100, \$40 per 500, \$75 per 1,000. Orders should be sent to: National Easter Seal Society, 2023 W. Ogden Ave., Chicago, IL 60613.



BRIGHT IDEAS

ART, SPORTS, PR AND PRACTICALITY

For the past two school years, our elementary students have done the program covers for the Forsyth High School sports programs. They drew football players, girls basketball players, cheerleaders and other subjects. A different picture was used each week or for each sports event.

The children used their art skills, and their parents were pleased to see their children's artwork put to good use. Overall, the project was a good public relations builder and a positive way for the elementary students to interact with the high school.

Kay Wright
First grade teacher, Forsyth Elementary
School

ORAL HISTORIES ENLIVEN LEARNING, COMMUNITY INVOLVEMENT

According to the newsletter of the Montana Oral History Association (MOHA), several Montana schools are discovering the educational value of oral histories.

The newsletter reports that for the past several years, 7th graders in Joyce Decker's Montana history class at Ronan Middle School have interviewed Ronan residents about life in the lower Flathead Valley. Thirty cassette tapes and 12 videotapes are now

part of the school library.

Using the tapes to study voices and personalities, Ronan students also have developed impersonations and entered them in the statewide Montana History Contest held each spring. The students gathered information for their scripts from the tapes or studies of figures in local history. Other students used material from the tapes in their displays, the newsletter said.

In their own community, students have used the oral histories in presentations during "A Night of History," celebrating the lower Flathead Valley's 75th Jubilee, and in a book, *In the Shadows of the Missions*, scheduled for publication in the near future.

In Helena, Sandy Barker's 7th and 8th graders at C.R. Anderson School used skills developed in an oral history class to put together a multimedia presentation on the 1984 North Hills fire. They also gathered information about the lives of Thomas Cruse and Jeannette Rankin.

Teachers routinely submit descriptions of their classroom projects for publication in the MOHA newsletter. Information about the newsletter or oral history projects may be obtained from MOHA/Oral History Office, Montana Historical Society, 225 N. Roberts, Helena, MT 59620.

Submit your teaching philosophy, point of view or a classroom idea for possible publication in Montana Schools. Maximum 250 words, preferably typed, double spaced. Include name, position, address. Send to: Montana Schools, Office of Public Instruction, State Capitol, Helena, MT 59620.

TRAINING OPPORTUNITY CALENDAR

MAY—OCTOBER 1986

The following are professional enrichment opportunities of interest to school personnel. For information about the calendar or inclusion of items, call Florence Anderson at OPI (444-2417). For information about specific listings, address inquiries to the contact person noted.

Summer is prime time for educators to take classes at colleges and universities. Classes are far too numerous to list here; contact the specific institution for listings and schedules.

Each calendar item is in the following order: date, type of event, title, location, duration (in parentheses), contact person, telephone number. In some cases, preregistration may be necessary. The calendar is current as of April 10, 1986.

MAY

- 14 Event: *Special Olympics Summer Games*, Helena (2 days); Ron Lukenbill, OPI, 444-2080.
- 16 Workshop: *Secondary Math Curriculum Trends, Use of Computer, Etc.*, Great Falls (1 day); Johnny Lott, UM 243-2403.
- 17 Inservice: *Migrant Education Statewide Inservice*, Billings (1 day); Angela Branz Spall, OPI, 444-4421.
- 27 Conference: *Interagency Transition Group Meeting*, Helena (1 day); Ron Lukenbill, OPI, 444-2080.

JUNE

- B Conference: *Women in Educational Leadership*, Cross Cut Ranch near Bozeman, (3 days); Pat Christie, OPI 444-5664.
- B Conference: *Rocky II: Rocky Mountain Health Promotion*, Billings (5 days); EMC, 657-2011.
- 9 Conference: *Vo-Ag Teachers Update*, Bozeman (5 days); Leonard Lombardi, OPI, 444-4451.
- 9 Workshops: *Advanced Driver Education*, Lewistown (54 one-day workshops, through Oct. 3, August excluded); Curt Hahn, OPI, 444-4432.
- 10 Conference: *Sexual Abuse of Children, Adolescents, Adults*, EMC, Billings (3 days); Ronald Sexton, 657-2349.
- 15 Seminar: *Physical Management*, Circle B Ranch W. of Choteau (5 days); Spencer Sartorius, OPI, 444-4434.
- 15 Seminar: *Business Week '86*, MSU, Bozeman (6 days); Rosemary Strope, 443-7888.
- 22 Conference: *A Woman's Place is in the Curriculum*, Santa Rosa, CA (4 days); Molly MacGregor, 707-526-5974.
- 23 Institute: *Curriculum Development for Gifted*, Indianapolis (5 days); Lita Bennett, 489-7470.
- 23 Workshops: *Current Topics in School Administration*, Bozeman (3 days); Ray Shackelford, OPI, 444-3169.
- 24 Course: *Use and Abuse of Drugs*, Missoula (4 weeks); UM School of Pharmacy, 243-4621.

26

Conference: *MT Assoc. for Pupil Transportation*, Great Falls (2 days); Terry Brown, OPI, 444-4396.

JULY

1

Course: *Mathematics for Middle School/Jr. High Grades*, Billings (11 days); David Davison, 657-2174.

14

Course: *Montana Law-Related Education*, Helena (5 days); Rick Bartos, OPI, 444-4402.

21

Course: *Mathematics for Middle School/Jr. High Grades*, Glendive (10 days); Pat Edgar, 365-3396.

AUGUST

4

Course: *Teaching Gifted/Talented Students Effectively*, Honolulu (5 days); Lita Bennett, 489-7470.

5

Conference: *School Food Service Annual Training*, Missoula (3 days); Bris Skiles, OPI, 444-2501.

10

Conference: *A Woman's Place is in the Curriculum*, Santa Rosa, CA (4 days); Molly MacGregor, 707-526-5974.

12

Conference: *School Food Service Annual Training*, Billings (3 days); Bris Skiles, OPI, 444-2501.

SEPTEMBER

24

Conference: *American Assoc. of School Librarians*, Minneapolis (5 days); AASL, 312-944-6780.

27

Conference: *Five Valleys Reading Council*, Missoula (1 day); Virginia Mart, 273-8886.

OCTOBER

B

Workshop: *Fall ECIA Chapter 1 Workshop*, Great Falls (3 days); John Ericksen, OPI, 444-3083.

15

Conference: *Math Curriculum Planning Conference*, Bozeman (1 day); Dan Dolan, OPI, 444-4436.

15

Conference: *School Administrators of Montana*, Great Falls (3 days); SAM, 442-2510.

15

Workshop: *NDN Talents Unlimited*, Columbia Falls (3 days); Ron Lukenbill, OPI, 444-2080.

16

Convention: *MEA Instruction and Professional Development*, Bozeman (2 days); Betty Lockey, MEA, 442-4250.

16

Conference: *MT Vocational Conference*, Great Falls (2 days); Leonard Lombardi, OPI, 444-4451.

16

Conference: *MT Assoc. of Teachers of English Language Arts*, Helena (2 days); Claudette Morton, OPI, 444-3137.

16

Conference: *MT Assoc. of Health, Physical Education, Recreation and Dance (MAHPERD)*, Helena (2 days); Jeri Domme, 443-1760.

SPACE SHUTTLE MEMORIAL FUNDS

The following are addresses of the various memorial and scholarship funds created in the wake of the loss of the space shuttle Challenger.

Fund to support the children of Challenger's astronauts:

Space Shuttle Children's Fund
American Security Bank
PO Box 0150
Washington, DC 20055
(Contact at bank: Roger Conner,
202-624-4695)

Memorial for astronauts:

930/Challenger Fund
c/o The Space Foundation
PO Box 58501
Houston, TX 77058
(Contact: Dr. William Urban,
713-332-0779)

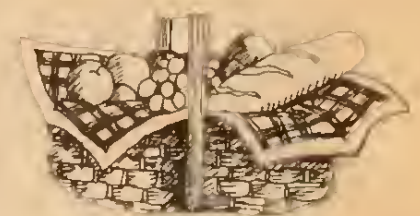
Fund for building new orbiter:

Richard MacLeod, President
Space Foundation
PO Box 1838
Colorado Springs, CO 80901
303-550-1000

Fund for scholarship for women in engineering/science in Judy Resnik's name:

Dr. Richard Cyert
Carnegie-Mellon University
603 Warner Hall
Pittsburgh, PA 15213
412-268-2900

USA Challenger
Scholarship Foundation
L.I. Hanson
7126 Eckert Rd., Suite 209
San Antonio, TX 78238



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